MAG SYSTEMS MANAGEMENT AND OPERATIONS PLAN

TAG Meeting #2 - Best Practices Webinar

September 7, 2016

Webinar Overview

- **Status**
- **Task 1 Overview**
- **Case Study and Best Practices Highlights**
- **Additional Regions**
- **Questions**
- **Next Steps, Next Meeting**

Current Project Activities

- **Tasks 1 and 2**

- **Task 1 – Examples from Other Urban Regions**
  - Interviews in progress
  - Draft document in progress
  - Innovative practices, processes

- **Task 2 – Current SM&O Inventory**
  - Infrastructure
  - Processes
  - Excel questionnaire – arterials and freeways

Today's Focus

- Review innovative and best practices
- Areas of comparable size/scale
- Several focus areas:
  - How ITS/SMO projects are identified and prioritized
  - How other region's establish strategic priorities
  - Performance metrics and performance-based considerations
  - Lifecycle planning for SMO infrastructure
  - Operational partnerships and responsibilities
  - Trends, successes and challenges

Expert Panel

- **Brief survey sent to expert panel**
  - USDOT/FHWA
  - Academic Institutions
  - Private consultants in the TSM&O industry
- **Potential case study areas**
- **Innovative practices**

Detailed Interviews

- **Atlanta Regional Council**
- **North Central Texas Council of Governments**
- **Delaware Valley Regional Planning Commission**
- **Houston-Galveston Area Council**
- **MetroPlan Orlando**
- **Southwestern Pennsylvania Commission (Pittsburgh)**
- **To be completed:**
  - San Diego, Seattle, Denver, Portland

Case Study Highlights

Systems Management and Operations

Some common themes

- **Designated funds for traffic signal optimization programs**

- **Strong institutional structures**

- **TSM&O link to Long Range Transportation Plans**

- **Performance measures gaining traction**

- **Methods for establishing TSM&O priorities**

Atlanta Regional Council (GA)

▪ Regional Snapshot

- 4.4 million population
- $1.5-$2 billion is spent annually on transportation in the region
- Georgia DOT is heavily involved in SM&O planning in the region
- GDOT operates freeways, various agencies operate traffic signals
- Strong TIM program

About the MPO

- o 13 full counties; 7 partial counties, and the City of Atlanta
- o 39-member board
- o 20 staff

Atlanta Regional Council
Institutional Framework

ARC's processes for SM&O in the region are formalized through multiple planning documents.

- **Regional Traffic Operations Plan**
  - Georgia DOT conducted the Metro Atlanta Operational Planning Study
  - Plan identified priorities and ranked projects, resulting in a set of recommendations

- **Transportation Element of PLAN 2040**
  - SM&O is a critical component
  - Long range plan allocates $3.5 billion to address non-recurring congestion by enhancing system operations
  - Project examples: traffic signal synchronization and communication; variable speed limits on freeways; Highway Emergency Response Operators; maintenance and repair of advanced traffic management systems technology; and arterial signal system upgrades at major regional destinations.

Atlanta Regional Council
Prioritization and Decision-making

ARC identified a network of critical roads to guide SM&O investment decisions.

- ## Strategic Thoroughfare Plan

  - Identified a Regional Thoroughfare Network, a collection of the most critical surface roads in the region (principal arterials and below)

  - Also developed management and design guidelines

  - Plan guides funding of projects and where to routinely monitor the system
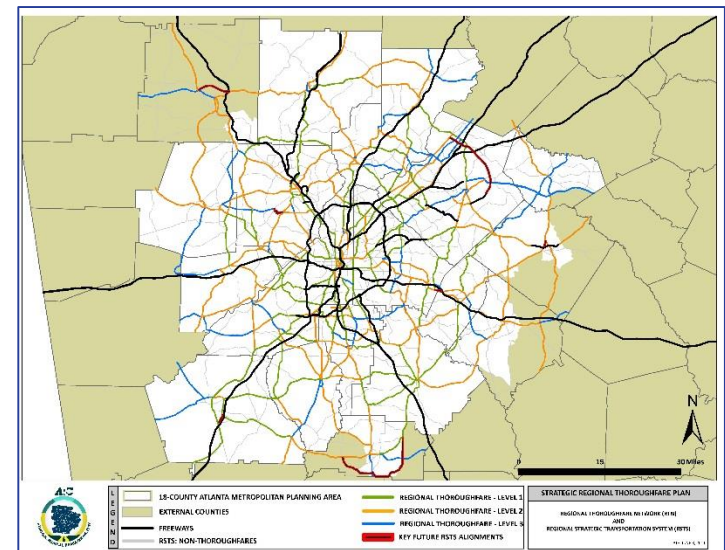
NCTCOG (Dallas, TX)
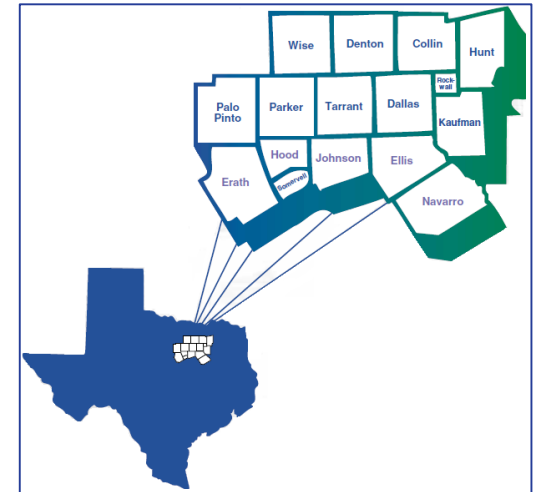
■ Regional Snapshot

- 7 million residents (11 million by 2040)
- 12,800 square miles (centered around Dallas and Forth Worth)

■ Operational Centers

- 2 TxDOT TMCs
- 17 City TMCs
- 2 Transit Management Centers

■ ICM Pilot Site

About the MPO

- o 16-county region
- o 168 cities
- o 22 independent school districts
- o 28 special districts
- o 15-member board
- o 324 staff

![Systems Management AND Operations Plan]

North Central Texas Council of Governments
Investment Prioritization

NCTCOG's ITS project selection process is based off of criteria that has been reviewed, vetted, approved, and successfully utilized on several projects.

- **ITS Project funding through the TIP requires completion of "Non-Competitive Project Selection Criteria for Traffic Signal and ITS Projects"**

- **Evaluation based on several non-competitive criteria:**
  - Connection to the Long Range Plan
  - Project location
  - Expected benefit/cost ratio
  - Expected impact on congestion and air quality
  - Extent of communication and data sharing capabilities
  - Multi-modal and multi-jurisdictional elements
  - Performance metrics
  - Whether the project fills existing ITS Infrastructure gaps

Non-Competitive Project Selection Criteria
Traffic Signal and Intelligent Transportation System Projects

Agencies interested in submitting an application for funding should provide information as noted in Eligibility Criteria Step 1. After submitting basic information, the agency or city should request an in-person meeting/conference call for Q&A with NCTCOG's Project Management and TIP Teams. Additional NCTCOG staff may participate as needed. Projects will be approved for funding through evaluation of the non-competitive project selection criteria. NCTCOG staff will screen for the following requirements:

Eligibility Criteria
Step 1
1. Agency to provide the project description, project schedule, design, timetable and other supporting documentation to the extent available.
   a. Project name and a brief description of the project (one paragraph) and its goals
   b. Map of the project location (electronic shape file, latitude/longitude or PDF)
      i. If central system or citywide, please indicate and no map is required.
   c. Contact information for the requesting agency project manager or appropriate staff
   d. Cost estimate including anticipated local match
   e. *Please note: project sponsorship must include a commitment to provide at least 20 percent of the total project cost from a local source, in order to qualify for federal funding.*
2. If the project is selected, the project sponsor will pay for any cost overruns.
   a. If data is available or collected, the project sponsor will share any project data with NCTCOG
      (e.g. if traffic counts are collected, must share information with NCTCOG)
      i. Formatting or file type requirements have not been established; may recommend using NCTCOG's format when established.
   b. If the project is selected, the project sponsor will protect project equipment from theft and vandalism during construction and after final construction acceptance.
      i. Protection may be validated by a statement and description of the protective measures.

Once NCTCOG staff has determined that the requirements in Step 1 have been met, staff will review and evaluate the eligibility requirements in Step 2.

Step 2
NCTCOG staff will verify all of the following eligibility requirements are met:

1

Asset Management

- ## Capital/Operations Asset Management (Cap-Main)

  - Data-driven process to analyze performance information (infrastructure conditions, traffic patterns, other characteristics) to identify probable corridor deficiencies

  - Help identify low to mid-cost techniques to address performance gaps
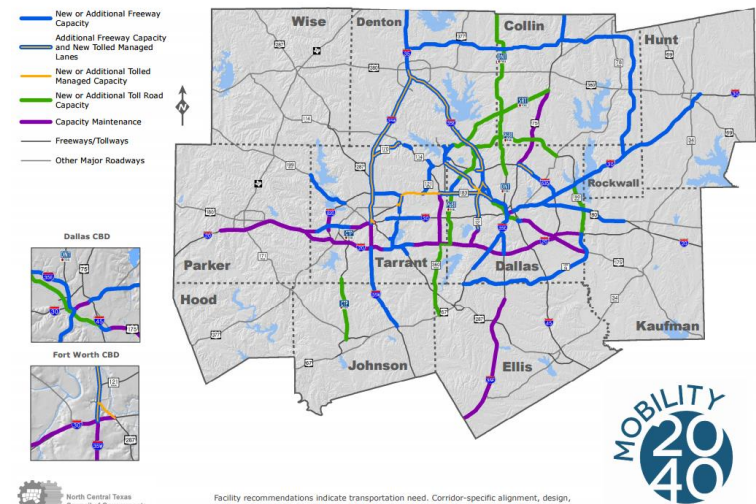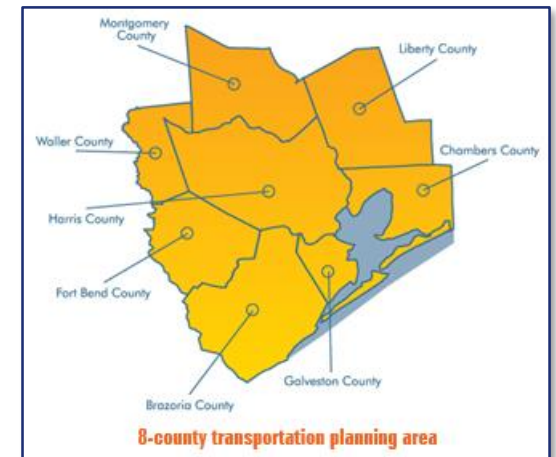
Case Study – Houston-Galveston, TX

▪ Regional Snapshot

- 6 million population
- TranStar Operations Center:
  - TxDOT
  - Harris County
  - City of Houston
  - Houston Metro transit
  - Traffic and Emergency Management Hub

8-county transportation planning area

About the MPO

- ○ 8 Counties
- ○ Over 100 cities

Performance Reporting
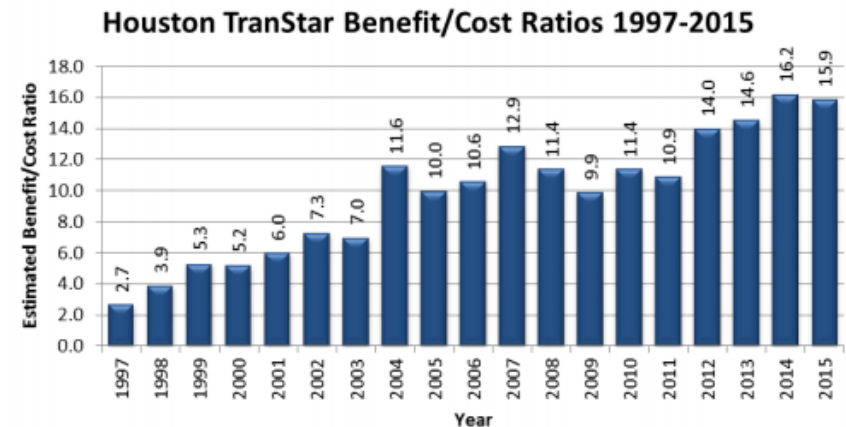
Both H-GAC and TranStar produce annual performance reports on a range of metrics, tracking both performance and trends

- **H-GAC Annual Mobility Report (2015)**
  - Safety
  - Asset Management and Operations
  - Emissions and Air Quality
  - Congestion Management

- **TranStar Annual Report (2015)**
  - Incident response and clearance
  - Freeway service patrol
  - Traveler information
  - Traffic signal optimization
  - Cost/Benefit

Houston TranStar Benefit/Cost Ratios 1997-2015

Bar chart — Estimated Benefit/Cost Ratio by Year:
1997: 2.7, 1998: 3.9, 1999: 5.3, 2000: 5.2, 2001: 6.0, 2002: 7.3, 2003: 7.0, 2004: 11.6, 2005: 10.0, 2006: 10.6, 2007: 12.9, 2008: 11.4, 2009: 9.9, 2010: 11.4, 2011: 10.9, 2012: 14.0, 2013: 14.6, 2014: 16.2, 2015: 15.9

MetroPlan Orlando (Orlando, FL)

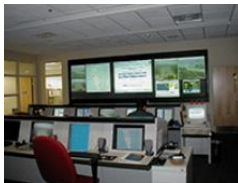- **Regional Snapshot**
  - 2 million population (2% annual growth)
  - 66 million annual visitors
  - $1.97 billion* in annual trans. funding
    local, state, and federal allocations in FY2011/12

- **2 Regional TMCs (Orlando)**
  - FDOT's District 5 co-located with FHP
  - Florida's Turnpike Enterprise

About the MPO

- Orange, Osceola, and Seminole Counties
- 23 municipalities
- 25-member board
- 17 staff

MetroPlan Orlando
Institutional Framework

MetroPlan Orlando's processes for planning, procuring, and operating SM&O in the region are formalized through several planning documents.

- **ITS Regional Master Plan** *(in development)*
  - Companion document to Long Range Plan
  - Provides metrics for performance-based ITS investment decision-making
  - Supported by elected officials

- **Management and Operations Strategic Plan**
  - Guides the Transportation Systems Management and Operations Advisory Committee
  - Includes processes for identifying, allocating, and implementing projects
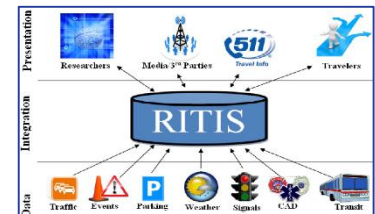
MetroPlan Orlando
Performance Measurement

MetroPlan Orlando utilizes standardized data to assess regional operations and translates findings into annual reporting to aid policy makers in pushing legislation that supports regional needs.

- **RITIS**
  - Agreement in place with UMD for Central Florida data
  - Data used to assess regional operations
  - Considered most useful source of regional data to-date

- **Tracking the Trends: Report on Transportation Systems Indicators**
  - Annual report providing overview of the region's transportation system needs
  - Used by policymakers to push transportation decisions

Systems Management AND Operations Plan

MetroPlan Orlando
Strategies and Tools

MetroPlan Orlando's **Traffic Signal Timing Program** continues to be successful in mitigating traffic congestion and improving air quality and has helped evolve TSMO program planning in the region.

- **$800,00 provided annually for program efforts**

- **Multiple agencies own and operate signals requiring significant coordination**

- **Before-and-after data collection and analysis**
    - Level of service, travel speeds, travel times data
    - Travel Time and Delay Studies and Benefit/Cost Analyses

- **Providing quantitative impact of program has helped push enhancements in TSMO programming**
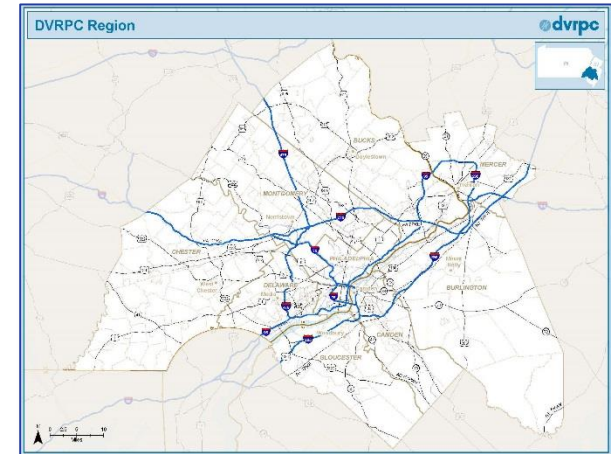
Delaware Valley Regional Planning Commission (Philadelphia, PA)

▪ Regional Snapshot

- 5.6 million population (10.7% growth forecasted through 2040)
- 4,000 square miles

▪ Regional TOCs

- NJDOT TOCs
- PennDOT TOCs
- New Jersey Turnpike TOCs
- Pennsylvania Turnpike
- Burlington County

DVRPC Region ⊙dvrpc

About the MPO

- o 9 counties in PA and NJ
- o 353 municipalities
- o 18-member board
- o 115 staff

Delaware Valley Regional Planning Commission
# Institutional Framework

DVRPC's processes for planning, procuring, and operating SM&O in the region are formalized through a master plan, and are supported by stakeholder tasks forces.

- **Transportation Operations Master Plan**
  - Drives operational transportation investments
  - Includes ITS Infrastructure Coverage Map to prioritize ITS investments

- **Regional Task Forces**
  - Transportation Operations Task Force
  - 8 Incident Management Task Forces
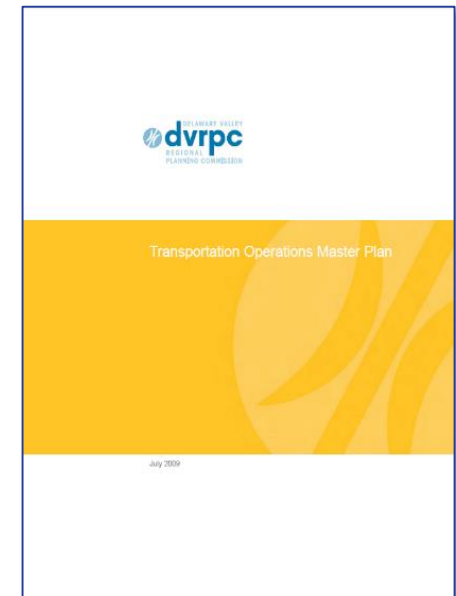
Delaware Valley Regional Planning Commission
Performance Measurement

DVRPC has a team of dedicated SM&O staff, and utilizes information sharing, mapping, and regional collaboration to support SM&O efforts.

▪ Staffing

- Transportation Operations Unit runs SM&O planning activities
- Unit is comprised 4 full-time staff members,
- CMP activities are handled by a separate unit, but SM&O and CMP staff work closely together on cross-cutting activities

▪ Strategies, Priorities, and Tools

- Regional Integrated Multi-Modal Information Sharing
- Interactive Detour Route Mapping
- Integrated Corridor Management and Active Traffic Management
- Regional Traffic Signal Optimization

SW PA Commission (Pittsburgh, PA)

- **Regional Snapshot**
  - Population of 2.57 million
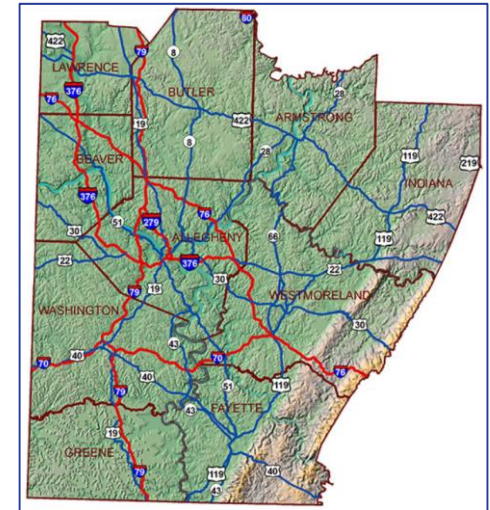 - 7,112 square miles

- **Regional Partners**
  - 10 transit operators
  - 3 Transportation Mgmt. Associations
  - PennDOT
  - Several others…

- **1 Regional TMC (Alleghany County)**
  - 24/7 operations
  - Run exclusively by PennDOT

- **1 Local TMC (Cranberry Township)**
  - Operated by local municipality for 50 signal
  - Unmanned center

About the MPO
- Includes 10 counties and Pittsburgh
- 555 municipalities
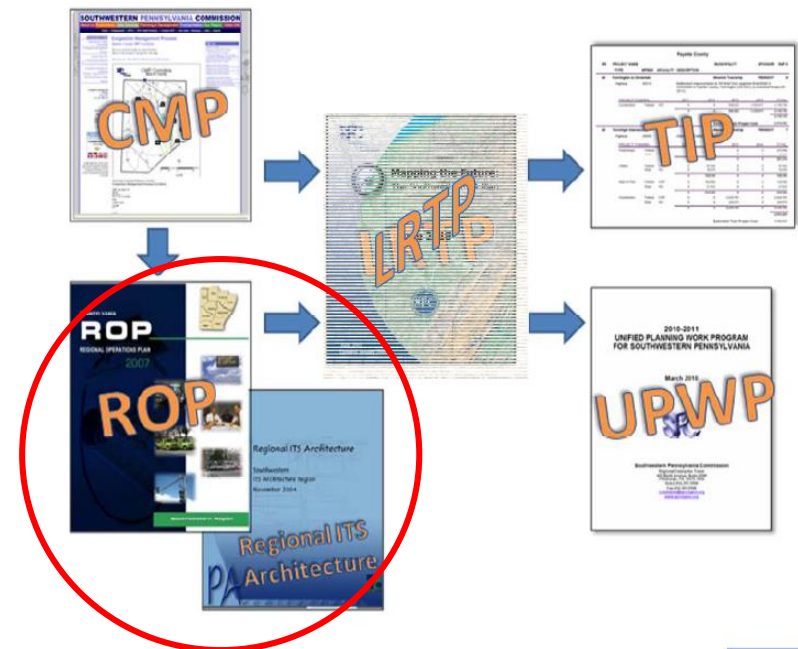
Southwestern PA Commission
Institutional Framework

SPC's SM&O planning processes and programs are formally documented and serve as the foundation for SPC's long range planning and priority projects.

- **Regional Operations Plan**
  - Accompanying document to Long Range Transportation Plan
  - Updated in 2015

- **Regional ITS Architecture**
  - Will be updated on monthly/quarterly basis in future
  - Updated in 2016

Southwestern PA Commission
Strategies and Tools

SPC's **Regional Traffic Signal Timing Program**, operating since 2008, has resulted in a 64:1 benefit/cost ratio in terms of reduced travel delay, reduced vehicular stops, and reduced fuel consumption and emissions.

- **Program conducted in phases**
  - Phase 1 and 2 complete, Phase 3 on-going
  - Phase 4 and 5 included in TIP

- **$5 million per cycle allocated to project (80/20 match)**
  - 250 signals per cycle (~10% of region's infrastructure)
  - Includes equipment, assessments, final design, construction, and implementation

- **Signals maintained/operated by municipalities, permitted by PennDOT**

- **Before/after quantitative studies – publicly available on website**

Best Practices

Systems Management and Operations

Development of a Regional M&O Plan

- **Southeastern Wisconsin Regional Planning Commission (SWRPC, Milwaukee area):** *Regional Transportation Operations Plan (RTOP),* **2012-2016**

  - A short-range plan identifying system operations measures and actions recommended for implementation.

  - Builds on the recommendations from the region's long-range regional transportation plan (RTP), and identifies the operations measures in the RTP recommended for priority implementation in the five year period, along with potential funding sources, and the relationship of each measure to the regional ITS architecture

- **Portland Metro (Oregon):** *Regional TSMO Plan, 2010-2020*

  - Identifies four key functional area priorities: multimodal traffic management, traveler information, traffic incident management, and transportation demand management

 - For each, identifies strategies and projects over a 10 year planning horizon
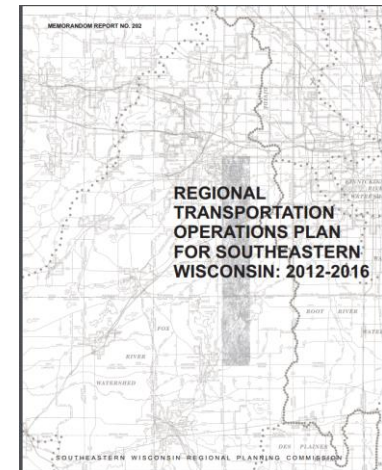
Identifying Priority Corridors

- **Delaware Valley Regional Planning Commission (Philadelphia region)**

  - Primary coverage areas: High volume, multi-lane limited access highways

  - Secondary coverage areas: Expressways at the periphery of the region and major arterials

- **SWRTC (Vancouver, WA region)**

  - Regional TSMO Network

- **Atlanta Regional Commission**

  - Strategic Regional Thoroughfare Plan
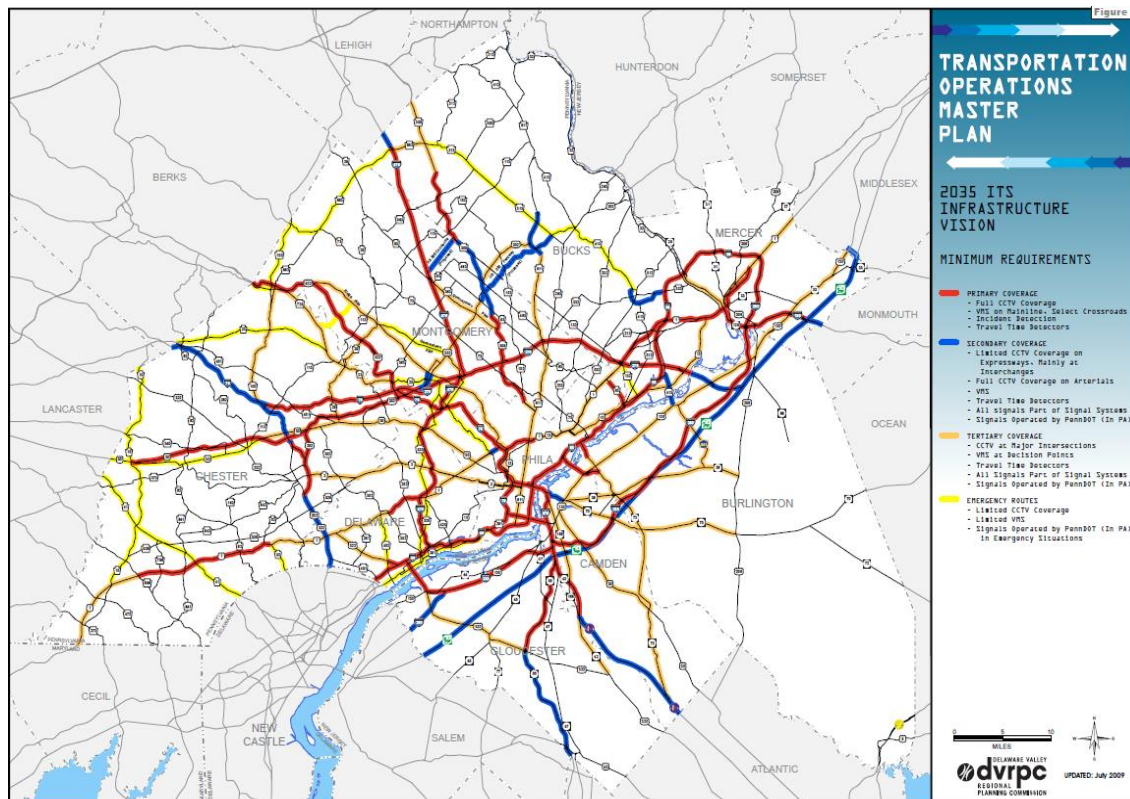
Using Performance Measures

- ## Denver Regional Council of Governments

  - Regional Concept of Transportation Operations (RCTO) identifies objectives and performance measures beyond traditional traffic congestion measures

Objectives	Initiatives	Performance Measures
Goal 1: Provide reliable transportation operations for regional travelers		
Daily Operations • Increase trip travel time reliability on freeways and arterials for all modes • Reduce traveler stops and delay due to signal operations *Incident Management* • Reduce average incident duration time • Reduce the occurrence of secondary incidents	*Daily Operations* • Continue to coordinate signal timing system management across jurisdictional boundaries • Continue to coordinate freeway management • Expand freeway management *Incident Management* • Establish Regional Incident Management Process *Work Zones and Special Conditions* • Improve work zone/special event management *Cross-cutting* • Coordinate/integrate multi-modal traveler information • Expand traffic monitoring capabilities and infrastructure • Establish shared monitoring between jurisdictions • Expand a shared communications network • Establish a shared data warehouse or data management process	• Travel Time Index (TTI) • Planning Time Index (PTI) • Transit on-time reliability • Arterial Progression Index (API) • Average roadway clearance time • Average incident clearance time • Number of secondary incidents
Goal 2: Provide safe transportation operations for regional travelers and for public safety and construction/maintenance personnel		
• Reduce traffic injury rates • Reduce traffic fatality rates • Reduce public safety and construction/maintenance personnel injury/fatalities	• Establish Regional Incident Management Process	• Traffic fatality rates • Traffic injury rates • Number of personnel injuries/fatalities
Goal 3: Provide transportation operations support for non-auto modes of travel		
• Reduce SOV mode share • Reduce per capita VMT • Reduce per capita greenhouse gas emissions	• Further coordinate/integrate multi-modal traveler information • Define criteria for operations improvements and monitoring for bicycle and pedestrians	• Single occupancy vehicles (SOV) mode share • Annual per capita VMT • Annual per capita greenhouse gas emissions

TSMO Project Prioritization Processes

- **Use operations performance measures**
  - Projects are scored based on support for performance goals, such as improving reliability and reducing congestion

- **Use cost-effectiveness measures**
  - Helps TSMO projects to compete for funding

- **Use TSMO committees**
  - Collaborative effort to provide input to evaluation and selection of TSMO projects

Establishing Consistent Criteria for Prioritizing Project Investment Needs

- ## Genesee Transportation Council

  - Dedicates funding directly to two priority TSMO projects: Implementation of the Highway Emergency Local Patrol (HELP) Program and funding for on-going staffing of the RTOC

  - Uses a performance-based approach to evaluate and rank project proposals using a set of common criteria and mode-specific criteria. A project can score up to 130 points: up to 100 points on the common criteria and up to 30 points on the mode-specific criteria

System Management and Operations						
1. Reduce travel times on major roadways	0	2	4	6	8	10
2. Reduce incident clearance times	0	2	4	6	8	10
3. Increase the productivity of regional transportation agencies/ providers (e.g., cost savings, time savings, etc.)	0	1	2	3	4	5
4. Support or advance existing and/or proposed ITS elements	0	1	2	3	4	5

Next Steps

- **Additional interviews – Portland, San Diego, Denver, Seattle**

- **Summary document distributed to TAG**

- **Feedback on key practices to consider for MAG SM&O Plan**

- **Task 2 – Surveys on Infrastructure and Processes**

Questions/Comments